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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/494,780	01/31/2000	Stefan Bahrenburg	GR 97 P 8073	3930

7590 05/14/2002

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EXAMINER
LOGSDON, JOSEPH B

ART UNIT	PAPER NUMBER
2662	

DATE MAILED: 05/14/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/494,780	Applicant(s) BAHRENBURG ET AL.	
	Examiner Joe Logsdon	Art Unit 2662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☒ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Rejections—35 U.S.C. 103(a):

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-6 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihashi in view of Richardson and Chennakeshu et al.

With regard to claims 1, 2, and 11-13, Ichihashi discloses a method and apparatus for transmitting data via a radio interface (abstract; Fig. 1). One connection is assigned at least two data channels (sending and waiting channels), whereby the data channels can be distinguished by spreading codes (SS-FH) (column 10, lines 15-30). Ichihashi fails to teach that data symbols and known midambles are transmitted in a data channel. Richardson discloses a radio communication apparatus and method for data transmission (abstract; column 3, lines 31-34). The method and apparatus inherently involve a radio interface. Data symbols and known midambles are

transmitted in a data channel (column 3, lines 31-34; claim 7; claim 19). Chennakeshu et al. teaches that the time over which channel tracking is required can be reduced during fast fading by using midambles (column 13, lines 4-9). It would have been obvious to one of ordinary skill in the art to modify the invention of Ichihashi so that data symbols and known midambles are transmitted in a data channel, as in Richardson, because, as taught in Chennakeshu et al., the time over which channel tracking is required can be reduced during fast fading by using midambles. It is inherently true that a number of midambles (e.g., one) used is less than the given number of data channels because there exist at least two data channels. Although Ichihashi does not teach that the same training sequence is used for different channels of the same connection, and that the training sequence differs from that of other connections, it would have been obvious to one of ordinary skill in the art to modify the invention of Ichihashi so that the same training sequence is used for different channels of the same connection, and so that the training sequence differs from that of other connections because such an arrangement would allow the training sequences for two different connections to be distinguished even if the two different connections use the same spreading code.

With regard to claims 3-5, neither Ichihashi nor Richardson nor Chennakeshu et al. teaches that the data symbols are superimposed in the transmitter. Examiner takes Official Notice that the superposition of CDMA data symbols, using either equal weighting or weighting based on a category of the symbols, has been well-known in the art. It would have been obvious to one of ordinary skill in the art to modify the inventions of Ichihashi, Richardson, and Chennakeshu et al. so that CDMA data symbols are superimposed, using either equal weighting or weighting based on a category of the symbols, because Examiner takes Official Notice that the

superposition of CDMA data symbols, using either equal weighting or weighting based on a category of the symbols, has been well-known in the art as a means for allocating bandwidth in a manner that depends on the categories, such as priorities, of the data symbols.

With regard to claim 6, Ichihashi fails to teach that the ratio of a mean power level per symbol between the training sequence and the data symbols is variable. Richardson teaches that the power level of groups of data symbols is varied (claim 7; claim 19). It would have been obvious to one of ordinary skill in the art to modify the invention of Ichihashi so that the ratio of a mean power level per symbol between the training sequence and the data symbols is variable, as suggested by Richardson, because such an arrangement would allow the system to distribute the power between the training and the data symbols as needed to maintain synchronization and relatively error-free communication.

With regard to claim 9, Ichihashi fails to teach that the data channels have different data rates. Ichihashi teaches, however, that the rates of the data can be converted (column 7, line 66 to column 8, line 40). It would have been obvious to one of ordinary skill in the art to modify the invention of Ichihashi so that the data channels have different data rates because such an arrangement would audio and video sources of different data rates to use the system.

With regard to claim 10, Ichihashi fails to teach that the radio interface includes a TDMA component, and that a finite burst comprising the training sequences and data symbols is transmitted in a respective time slot; and wherein an assignment strategy for connections to a time slot is based on a number of training sequences to be estimated per time slot. Chennakeshu et al. teaches that the radio interface includes a TDMA component (column 4, lines 13-34) and that a finite burst comprising the training sequences and data symbols is transmitted in a

respective time slot (column 5, lines 52-63; column 13, lines 4-11). The assignment strategy for connections to a time slot inherently depends on a number of training sequences to be estimated per time slot because the larger the number of training sequences to be estimated per time slot, the smaller the number of connections that can be served by that time slot and vice versa. It would have been obvious to one of ordinary skill in the art to modify the invention of Ichihashi so that the radio interface includes a TDMA component, a finite burst comprising the training sequences and data symbols is transmitted in a respective time slot, and an assignment strategy for connections to a time slot is based on a number of training sequences to be estimated per time slot, as in Chennakeshu et al., because such an arrangement would be helpful in combating fast fading by reducing the time over which channel tracking is required.

4. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihashi, Richardson, and Chennakeshu et al. as applied to claim 1 above, and further in view of Hottinen et al.

With regard to claim 7, neither Ichihashi nor Richardson nor Chennakeshu et al. teaches that the training sequences are evaluated for channel estimation at a receiving end, with a length of an estimated channel impulse response being variable. Hottinen et al. teaches that the training sequences can be evaluated for channel estimation at the receiving end (column 5, lines 56-67). Hottinen et al. further teaches that the channel estimates are obtained by estimating the channel impulse response (claim 6). This arrangement enables the system to detect signals in a TDMA mobile system in spite of co-channel interference (abstract). The length of the estimated channel impulse response is inherently variable because statistical estimates are, by their nature, variable.

It would have been obvious to one of ordinary skill in the art to modify the inventions of Ichihashi, Richardson, and Chennakeshu et al. so that the training sequences are evaluated for channel estimation at a receiving end, as in Hottinen et al., and with a length of an estimated channel impulse response being variable because such an arrangement would enable the system to perform signal detection in spite of co-channel interference.

With regard to claim 8, neither Ichihashi nor Richardson nor Chennakeshu et al. teaches that the training sequences are evaluated for channel estimation at a receiving end, with a length of the training sequences being variable. Hottinen et al. teaches that the training sequences can be evaluated for channel estimation at the receiving end (column 5, lines 56-67). This arrangement enables the system to detect signals in a TDMA mobile system in spite of co-channel interference (abstract). Neither Ichihashi nor Richardson nor Chennakeshu et al. nor Hottinen et al. teaches that the training sequences have a variable length. It would have been obvious to one of ordinary skill in the art to modify the inventions of Ichihashi, Richardson, and Chennakeshu et al. so that the training sequences are evaluated for channel estimation at a receiving end, as in Hottinen et al., and with a length of the training sequences being variable because such an arrangement would enable the system to adaptively perform signal detection in spite of co-channel interference.

Response to Arguments:

5. Applicant argues that claims 1 and 11 describe a direct sequence CDMA spreading code. The claims, however, describe only a spreading code. The frequency hopping spread spectrum

method taught in Ichihashi uses a spreading code. Examiner cannot read the specification into the claims, so the "spreading code" in the claims could apply to frequency hopping just as well as to direct sequence.

Applicant argues that in the GSM system of Richardson, the training sequences of two different channels must be different. But this is not true when the different channels use different spreading codes. When they use different spreading codes, identical midambles can be distinguished at the receiver.

Applicant argues that there would have been no motivation to combine the references. The motivation to combine has already been provided in the rejections of the previous Office Action and are repeated in this Office Action.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Logsdon whose telephone number is (703) 305-2419. The examiner can normally be reached on Monday through Friday from 1:00 pm to 9:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou, can be reached at (703) 305-4744.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700.

8. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or faxed to:

(703) 872-9314

For informal or draft communications, please label "PROPOSED" or "DRAFT".

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Joe Logsdon

Patent Examiner

Saturday, April 06, 2002

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